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HIS HEART IS SET ON SALT AND WATER

Desalination pioneer Diem Vuong retiring from L.B. Water Dept.

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Monday, June 20, 2005 - LONG BEACH - The "in' and "out' boxes are empty.

The rest of the desk is almost as clear. Only three neat rows of stacked paperwork suggest that any administrative work remains.

This is Diem Vuong's office at the Long Beach Water Department. But this is not where the department's assistant general manager wants to be.

For weeks, Vuong has reduced his schedule at the office. And July 8, when he officially retires, he will gladly retire the budget and personnel matters that take place here as well.

Instead, he will focus on what has become his passion: salt and water.

"The reason why I retired is I want to work only in desalination,' he says.

Since 1999, Vuong has been the mastermind behind the Water Department's effort to turn ocean water into drinking water. As a result, the 61-year-old Vietnam native may end up having a more dramatic impact on the future of the city's water system than anyone who came before him.

Vuong invented a desalination process that saw early success in a prototype lab that he convinced the city to build in a nook of its water treatment plant.

That success helped the city secure $8 million in local and federal funding to build a 300,000-gallon-per-day desalination research plant. That plant is under construction in East Long Beach near the Haynes Generating Station.

Because of an unusual patent arrangement Vuong shares with the city, his work could soon benefit the Water Department's bottom line, as well as its available water sources. Under the deal, Vuong has agreed to split any royalties from his desalination method, which is catching attention from water wonks nationwide.

Discussing his invention at the under-construction research plant he hopes will verify his scientific theory, Vuong's passion is evident.

Removed from the confines of his office paperwork, Vuong's speech picks up its pace, his smile widens with his eyes, his fingers extend on his gesturing hands as he discusses the technology he created.

"We're trying to prove ours is better,' he says.

Water Experience

Before working his way up the Long Beach water ranks, Vuong did the same in his native Vietnam.

Vuong graduated from the University of Saigon with degrees in chemistry and chemical engineering. He eventually became Vietnam's top water official, overseeing treatment systems that ranged from modern pipes to piles of sand acting as natural filters.

"It was really a very hectic life because the water system was scattered all over 44 districts,' he says.

In April 1975, with Saigon falling to North Vietnam and the last Americans evacuating the country, the high-ranking Vuong and his wife were convinced that they and their three children had to leave as well.

"We knew my life was in danger,' he says.

The family received a military airlift from Saigon and eventually landed at Camp Pendleton. Vuong, who spoke English, soon found work as an engineer with the city of San Juan Capistrano. In 1980, he left for a job in Anaheim, where he helped oversee construction of a treatment plant.

In 1996, Long Beach recruited him to help with construction issues on the city's water treatment plant at Spring Street and Redondo Avenue.

But it wasn't until 1999, and an opportune question at a water conference, that Vuong's interest in desalination began.

Pressure Drop

At the International Desalination Association conference in San Diego that year, Vuong noticed that many methods had a similar pattern: ocean water thrust through membranes at high pressure to extract the salt.

Vuong raised his hand.

"Can you drop the pressure?' he asked.

The answer was a resounding "no.'

Unconvinced, Vuong went home and began to tinker with the idea.

Over time, he produced a model that lowered the pressure and added a second layer of membranes, or filters, to block remaining salt molecules. The result was potable water that required 20 percent to 30 percent less energy to produce, at less cost, than the traditional membrane method.

To prove his theory, Vuong in 2001 approached Kevin Wattier, who had just become the Water Department's general manager.

"He started scribbling the differential equations on my note pad and started explaining the science,' Wattier recalls. "I knew enough to know he knew what he was talking about.'

Patent Pending

Wattier agreed to spend $75,000 on a 9,000-gallon-per-day prototype, and the city applied for a patent on the technology, dubbed the "Long Beach Method.'

The patent application, which is still pending, lists Vuong as the inventor. But the city and Vuong agreed to split any royalties that might come along with the technology.

If research eventually proves Vuong's theories, the city would share the technology with other government agencies at no charge, says Donna Gwin, the senior deputy city attorney assigned to the Water Department. But if the technology finds a market in the private sector, the city and Vuong would split any proceeds, under terms of the agreement.

Because Vuong invented the method on his own time, Gwin says, it was his decision to let the city in on the deal.

"I felt, look, I owe the city for giving me a chance,' Vuong says.

So far, his chance is proving successful.

Big and Small

When construction of the desalination research plant ends in August, the city plans to spend two more years studying Vuong's method. If the science and cost projections hold up, the city hopes to build a 10 million-gallon-per-day plant and incorporate desalination into the city's water supply.

Vuong hopes to remain involved in that process, perhaps as a consultant. But while the city's focus gets bigger and bigger, Vuong's focus is getting smaller and smaller.

After retirement, he plans to develop a prototype desalination device that would allow boat owners to use the Long Beach Method to make drinking water while at sea. While similar devices already exist using different technology, Vuong hopes his method, combined with solar power, will drop the cost and the amount of ocean water needed to produce a gallon of drinking water.

Attention Grabbed

Meanwhile, the Long Beach Method is getting attention in water circles.

Vuong and other department officials have been invited to several scientific conferences in recent years to discuss the technology. Next month, they will present their research, along with a peer review, at the annual American Water Works Association conference in San Francisco.

Is the buzz catching?

"The answer is yes, definitely,' says Eric Hoek, a civil and environmental engineering professor at UCLA.

Hoek says the fact that Vuong and the city applied for a patent has only increased attention in the process.

"Everyone who's interested in membranes and desalination, at least in the United States, is going to be familiar with what they're doing,' he says. "I think the group out of Long Beach is very innovative.'

Next Stage

As Vuong's fortunes have risen with the city, so have those of his family.

After leaving Camp Pendleton 30 years ago, Vuong settled in San Clemente. He still lives there, commuting to and from Long Beach. His 1997 Toyota Camry, which he bought after taking the Long Beach job, has logged 240,000 miles. It receives an efficient 30 miles to the gallon, he notes.

City officials say they are glad he made the trip. He leaves having made an impression, Gwin says.

"I tell you, without a doubt, he is the smartest man I've met in my entire life,' she says.

That appears to run in the family.

Vuong's three children born in Vietnam, and the two born in the United States, were all valedictorians in school. Two are doctors. Two are lawyers. The youngest, at 21, is graduating from UCLA this month to become a teacher.

Reflecting on his tenure with the city, Vuong says he is pleased to see the progress the city's desalination effort has made. While he won't miss the administrative aspects of his job, he is looking forward to continuing work on a technology that could benefit both himself and the city.

"I'm just going to serve the city in a different capacity,' he says, "and, I feel, a better capacity."